DOCUMENT RESUME

ED 141 201 SO 009 986

AUTHOR Steiner, Elizabeth
TITLE Educology: Its Origin and Future.
PUB DATE Apr 77
NOTE 37p.; Paper presented at Annual Meeting of the American Educational Research Association (New York, New York, April 3-8, 1977); Not available in hard copy due to poor reproducibility of original document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Conceptual Schemes; *Definitions; Degree Requirements; *Education; Educational Improvement; *Educational Philosophy; Educational Practice; *Educational Research; Educational Theories; Foundations of Education; Higher Education; Knowledge Level; Learning Processes; Scientific Concepts; Teacher Education; Teaching; Vocabulary Development

ABSTRACT

The paper defines and classifies educology and examines its merit from the perspective of philosophy of science and its significance for the methodology of educational inquiry. The term educology implies a body of knowledge with scientific merit that is unique to the description and explanation of teaching-learning processes. Chapter I discusses education as a teaching-learning process, followed by presentation of qualitative, quantitative and performance examples of education in chapter II. Chapter III presents anecdotes on educology from educational literature. The relation of educology to sociology and psychology is explored in chapter IV, followed by discussion of how to produce educology in chapter V. Two types of theory models of educology are discussed: (1) mechanistic, consisting of parts that act in predetermined ways to bring about specific effects; and (2) organismic, structured as a unit whose content and form are determined by function. Chapter VI focuses on the importance of educology in sorting out linguistic confusion in educational research. Ways of furthering educology are identified in chapter VII, including training in educational research methodology, statement of objectives in educology programs, and improved teacher education. The conclusion is that educology must have a degree program on the university level if it is to nurture and advance knowledge about education. (Author/DB)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED141201

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL BY MICROFICHE ONLY HAS BEEN GRANTED BY
Elizabeth Steiner
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER"

EDUCOLOGY:
ITS ORIGIN AND FUTURE

by

Elizabeth Steiner
Indiana University

SO 009 986

Symposium on Educology
American Educational Research Association
New York, 1977

I

ON THE SENSE OF EDUCATION (1)

> Do you know, Carter, that I can actually write
> my name in the dust on the table?
> Faith, Mum, that's more than I can do. Sure's
> there's nothing like education after all.
> Punch, Vol. cxxii, p. 142, 1902

In what sense is Carter using 'education'? Does Carter mean the activity directed to the development of the ability to write or the process of acquiring the ability to write or the acquired ability of writing? That is to say, is he referring to teaching, learning, or being learned? The answer to this question, of course, is unimportant, but the attempt to answer it has brought to mind the various senses recorded in our dictionaries.

Surely then the sense of education is clear. It has three senses and, again in the language of Punch, "you pays your money and you takes your choice." But choice must be in terms of something or other.

I submit that while a certain disorder in dress may be fetching, in thought and its expression it is non-productive. Logic or order is a requirement for productive thinking. Thinking must be focused or be functional, and so must be structured accordingly. To be structured is to have form and content. Logic or order, therefore, comprises pragmatics (functional aspect), syntactics (formal aspect), and semantics (aspect of content).

The choice of a sense of education must be made in terms of

the logic of that discourse which expresses the thoughts of educational experts. A parallel would be a sense of space chosen in terms of the logic of physics.

But is there an expert discourse that can be sorted out from other discourse about education? Since I contribute to such discourse (2), I take the answer to this question to be affirmative. This answer is neither popular nor easy of acknowledgment (particularly among academicians not in units designated by 'Education'), for most take themselves to know what they are part of (most academicians teach and all persons learn). Subtleties of kinds and degrees of knowing do not disturb their smugness. We all find ourselves in space and know how to move about, but unless we are experts, we do not invade the palace of physics.

From an analysis of expert discourse about education emerges a sense of education that combines teaching and learning. Education is taken to be a teaching-learning process.

If education were taken simply as learning, it would encompass too much. Learning as a process or an attainment can occur without teaching, e.g. learning by discovery as the discovery process or the discovery result. Learning by discovery is one way of characterizing both the process of inquiry and its results. Research and development centers thereby do not become inquiry-oriented educational institutions. In educational institutions, at the very least, inquiry methodology is taught, while in research and development centers

mastery of inquiry methodology is assumed. To be sure, researchers and developers are not restricted in their inquiry to the substantive dimension. They could make discoveries about methodology. So it is true that we should always learn but not always be taught. We should continue to develop cognitive structures, yet not always under the guidance of another. Education should give way to inquiry to make possible human beings' advance into novelty.

Learning, however, must be taken as studenting in order to sort out training from educaion. Human beings are the learners in education not non-human animals. One speaks of training seals not educating them. Human beings as learners are active not reactive. They are I's engaged in their own development; they intend to learn and so deliberately engage in learner tasks. They are students not mere learners; they are studenting not merely learning. In training there is teaching, but the learner is reactive not active. The learner's behavior is modified through contingencies. Radical or metaphysical behaviorism is an adequate approach to training. The existence of mental states can be denied.

It is not clear whether 'training' is used correctly when one characterizes the teaching-learning process in the very young human being. Can mental states be discounted in the infant? Should one speak of toilet-education or of toilet-training? It is clear that training is not used ocrrectly when it is equated to 'skill education', e. g. training of athletes (involving more than physical

conditioning) or training of airplane spotters. This incorrect usage arises from taking the learning of skills as not learning to know and concomitantly linking non-cognitive learning with non-intentionality on the part of the learner. Learning a skill, nevertheless, is coming to know performatively. Athletes are educated not trained to be skillful. As contrary as it seems, athletics is a cognitive field of studies.

If the expert sense of education is taken to be the teaching-studenting process, does one simply reject education as being learned? To be learned is to achieve learning not simply to be involved in the task of learning. However, the task of learning can occur even though it is not effective. To add the sense of being learned to the teaching-studenting process is to add to education the modifier 'effective'. Education, therefore, is the teaching-studenting process, while effective education is the teaching-studenting process in which learning is achieved not merely engaged in. To state the matter differently, 'education' is both a task and an achievement word. As an achievement word, 'education' is an elliptical expression for 'effective education'.

II

ON KNOWLEDGE ABOUT EDUCATION (3)

> What is all knowledge too but recorded experience, and a product of history; of which, therefore, reasoning and belief, no less than action and passion, are essential materials?
>
> Thomas Carlyle, On History

As Carlyle notes, knowledge is not knowledge unless it is recorded. One can know, yet to be knowledge one's knowing must be made public. To be made public is to represent one's cognitions. Inasmuch as signs represent, they can be used to this end.

To explicate knowledge what one does is to set forth the logic or order in the systems of signs that comprise it. Pragmatics, syntactics, and semantics together constitute logic. A system of signs not only has a form, it also has function and content.

Turning first to pragmatics, knowledge functions to describe states of affairs and so knowledge of education to describe teaching-studenting states of affairs. Descriptions of states of affairs can be of either instances or unique entities or action. In terms thus of three sub-functions, quantitative, qualitative, and performative knowledge of education can be distinguished.

Rarely do discussions of knowledge of education address either qualitative or performative knowledge. Qualitative matters are taken as affective and performative ones as motor, and so both are expelled from the garden of cognition.

Qualitative knowledge of education would be a representation

of either prehension or comprehension or appreciation of a unique teaching-studenting state of affairs. An example of qualitative knowledge of education is found in Studs Lonigan. In this work, James Farrell does more than to represent the affect upon him of the education of Studs, an Irish-American working-class boy, in a south Chicago parochial school during the thirties. Rather, he represents his configurational grasp and perspicacious judgment of that unique teaching-studenting state of affairs.

Performative knowledge of education would be a representation of an action which is a teaching-studenting state of affairs. All action is not essentially motor. Swimming is, teaching is not. Moreover, action is not passive or reactive. Actors take part. There is deliberateness in action, and thus doing is structured, given form and content, in terms of an outcome, a function. Actions are cognitive. The recording of performative knowing of education has been neglected. Reliance instead has been placed upon vis-a-vis transmission. Yet there are not enough masters (adequate--knowledge-able--performers) to face each apprentice. Also masters are not immortal. Without knowledge (recorded knowing), we begin anew each generation or so. We remain dwarfs instead of becoming giants by being on the shoulders of the past. Consequently, more attempts to produce performative knowledge of education, as the one at Indiana University in the Center for Development of Teacher Education Materials, are necessary.

While qualitative and performative knowledge of education have been neglected and unacknowledged, quantitative knowledge of education has not. The Journal of Educational Research gives eloquent testimony of attention and acknowledgement. Yet it is not always understood that knowledge consisting of generalizations is quantitative. To many 'quantitative' pertains to numbers. Still generalizations involve extensions, ranges relative to classes. The range of class ~~are~~ is the instances having membership in that class. As an example, the generalization:

> Post organizers of material facilitate retention of that material

is quantitative, since its translation:

> All post organizers of material are facilitators of retention of that material

indicates that within the universe of a given material all the instances having membership in the class of post organizers are placed within the class of facilitators of retention. 'All' is a universal quantifier. Furthermore, it should be noted that instances though individual are not unique. To be unique is to be one of a kind, and thereby to make 'kind' meaningless. Therefore, quantitative knowledge is of individuals, but thereby is not qualitative. Qualitative knowledge is of individuals in their uniqueness.

Not only have qualitative and ~~affective~~ performative matters been expelled from the garden of cognition, some quantitative matters have been sent forth likewise. Praxiological and philosophical matters have

been taken as affective, and so as non-cognitive ones demanding expulsion. Only scientific matters have been taken as legitimate inhabitants. All knowing thereby is narrowed to scientific knowing. All knowledge becomes scientific knowledge.

Just as I have displayed the legitimacy papers of qualitative and performative matters, I shall do so for praxiological and philosophical ones. With this display, the garden of cognition will be fully occupied with qualitative, performative, and quantitative matters. And among the quantitative offspring all will be present: philosophical and praxiological as well as scientific.

The scientific offspring of quantitative knowledge of education is the one most recognized. Indeed The Journal of Educational Research usually records scientific knowledge of education.[8] Scientific knowledge about education consists of true generalizations and observations of the teaching-studenting process. The generalizations describe the classes of each of the classes of the teaching-studenting process (which I take to be teacher, student, curriculum in the sense of content to be taught and learned, and setting in the sense of auxiliary persons--e.g., administrators--and objects--e.g., buildings) and the interrelation of these classes. The observations describe teaching-studenting states of affairs as members of classes. Generalizations constitute theoretical knowledge; and observations, factual knowledge. It should be noted that many scientists are accustomed to limiting the term 'theoretical' to higher-order

8

generalizations (those that cannot be directly related to observations), and to using 'law' for lower-order generalizations (those that can be directly related to observations). A familiar example from physics is The Kinetic Theory and Boyle's Law. This limitation is not warranted from a logical standpoint, since whether more or less general the descriptions are general.

In scientific theoretical knowledge of education, the generalizations are non-axiological. The generalizations do not describe what is effective. In this sense, the science of education is value-free. However, the science of education is not value-free insofar as its content is descriptive of what is taken by persons in the educational process to be effective. If educational science describes the educational values persons do hold, the content is descriptive of what is valued as educational. Still what is taken to be effective in education is not necessarily what is effective. To so argue is to commit the naturalistic fallacy, i.e., to make axiological matters scientific ones when such matters are either praxiological or philosophical.

Praxiology of education is not merely science of education applied to bring about educational states of affairs which are taken as valuable in the sense of having positive affect. This has been the usual conception of technology, i.e., as applied science. I use 'praxiology' instead of 'technology' to avoid the unwanted notions of hardware (in discourse about education 'technology' relates to the hardware aspect of educational practices) and of technique with its connotation of specificity. Rather, praxiology is a quantitative

knowledge of actions not solely derivable from science.

An educational practice is a class of teaching-studenting actions. Since action is deliberate, it involves a means-ends ordering. There is a devising of the doing in order to achieve an end. Effectiveness is wanted in action. Attention, therefore, is given to instrumental value, to goodness-for. Even though educational science does describe quantitatively the interrelation of components of the teaching-studenting process, this description is not sufficient to derive interrelations in which one of more components are ends relative to other components as means. Instrumental evaluation is not encompassed in educational science. The science of education, to be sure, does describe quantitatively what is taken as effective. Let me repeat, however, that what is taken to be effective in education is not necessarily effective in education. Praxiology of education, therefore, is required to provide generalizations and observations about educational practice.

If science of education has as its object education and praxiology of education effective education, what remains for philosophy of education? The reply, "Theorizing," will not do. Educational scientists and praxiologists can do their own theorizing. But theorizing about non-instrumental goodness in education has been overlooked. It is a pragmatic fallacy to take what is effective as necessarily good-in-itself. Both the means and ends of practice must be evaluated. No doubt generalizations describing educational

practices for thievery (recall Fagen's school for thieves) could be produced.

In the teaching-studenting process, something is taught. The something taught or curriculum is taken from the culture. Language is a vehicle for both the expression and transmission of the culture, so the teacher and student behave linguistically. Adequate linguistic behavior, adherence to rules or ordered linguistic behavior, results in expression or transmission of the culture selected. Selection depends on what kind of learning is taken to be good. If knowing is taken as good, knowledge is selected from the culture. The teacher then attempts to bring the learner to know. In addition to questions of ends, of goodness of learning, there are questions of means, of goodness of behavior of one individual relative to another in the educative process. Teacher and student interact as could other persons, such as administrators, counselors, and custodians. Therefore, if the quantitative description of the teaching-studenting process is to be complete, then descriptions of good learning, of truth in the curriculum and its transmission, of order in the language behavior of teacher and student, and of goodness in the interaction of persons in the teaching-studenting process are required. These requirements delineate branches of philosophy of education--ethics of education, epistemology of education, logic of education, and social philosophy of education.

III
ON EDUCOLOGY

> At that, a scholarly voice rose above the hum of comment "Let's build a scientifically professional word from Greek and Latin roots. If only science is respectable in these modern days, we must put ology into it."
>
> "When I was a boy, the phrase was 'put oomph into it'," murmured a gay looking, nattily dressed guidance specialist.
>
> The scholarly one ignored the interruption. "All agree that we are trying to develop and lead out the natural powers of the learners, so we should use e duco. I move that our basic term be educology, the science of 'leading out' or "developing the natural powers'."
>
> Lowry W. Harding, Anthology in Educology

In 1964 when I introduced the term 'educatology' at a national meeting of philosophers of education (4), I was not aware of the term 'educology'. William Gruen, a fellow philosopher of education, during the discussion of my paper, suggested that I substitute 'educology', since 'educatology' was not only ugly but an improper union. I concurred, and subsequently used 'educology' (5).

Whether Gruen knew of Harding's three published collections of humorous materials about education called 'works in educology' (one more collection was to appear in 1965) (6), I know not. Harding's use of 'educology' was brought to my attention in a footnote in an article, "Educology: The Theory of Educational Practice" (7). The footnote by J. B. Briggs is as follows:

> The term "educology" was contracted from EDUCational psychOLOGY since a "flat earth" version (see below) of psychology is believed to comprise the major portion of the "logos" of

> education. Harding (1951) and [E. Steiner] Maccia (1964) use the term "educology" in rather a different sense, that is, as a taxomony for educational studies. [E. Steiner] Maccia's alternative term "educatology" (op. cit.) might be reserved for the taxmemic usage. (p. 279)

This footnote led me to believe that Harding and I were both scholarly ones.

Harding's anthology was out of print, but a abstract in Education Index suggested a tongue-in-cheek approach. Since I was not in Australia, a telephone call elicited all four volumes from Harding. What Harding was about is clear from these lines excerpted from a letter to James Thurber:

> . . . I am compiling a small anthology of essays on the lighter, human side of teaching. Selections included will be ironically, sympathetically, sardonically, satirically, or urbanely humorous, while at the same time emphasizing an educational principle. Since the collection is not to be a textbook, and will appear to limited numbers of people, it is to be printed as inexpensively as is compatible with taste. To be consistent in title, content and purpose, the volume will be entitled Essays in Educology. (8)

Incidentally, James Thurber added the following footnote to his reply:

> P.S. I think your suggested title is flat and it runs into awkward repetition in the first sentence. If this is a book of humor it should be livened up. Try "How to Draw Your Eye." (9)

As you recall Thurber's story "University Days" ends with "'You've drawn your eye!'".

Perhaps Harding and I were said to use 'educology' in a taxmomic

sense, because we included more than Biggs. A review of Harding's four collections indicates inclusions other than humorous essays emphasizing educational principles. Cartoons and poems are found also. To illustrate

EDUCATION
Joel H. Hildebrand
A child of the new generation
Refused to learn multiplication.
He said, "Don't conclude
That I'm stupid or rude;
I am simply without motivation." (10)

And I in 1964 noted educational science as only one kind of educology. Biggs seems to restrict educology to a basic discipline that is applied and much like what I take praxiology of education to be. Yet he accepts both Harding's and my extensions as long as we call them by a different name, 'educatology'.

Yet there is little justification for taking a term that refers to all of knowledge of education and limiting it to some. Science of education and philosophy of education belong just as much to the quantitative realm of educology as does praxiology of education. Furthermore, there is qualitative and performative knowledge of education. And withal, humor should prevail. Thus, when 'educologist' is called a smiling compleat educational researcher is wanted.

IX/
ON THE RELATION OF EDUCOLOGY
TO OTHER KNOWLEDGE

'What's the use of their having names,' the
Gnat said, 'if they won't answer them?'

'Psychologist' is the name for someone who should be concerned with mental processes, while 'sociologist' is the name for someone who should be concerned with social processes. When we call either name, however, persons who are without these concerns or who have severely limited them are the usual respondents.

When one calls 'psychologist', a behavioral scientist who may or may not deny mental states usually steps forth. This behavioral scientist often is one who is concerned with learning, less often with learning relative to teaching, and rarely with studenting relative to teaching. If this behavorial scientist is within a unit designed as 'Education', we usually use the name 'educational psychologist'.

Clinical psychologists may step forth, and they traditionally have concerned themselves with mental processes. However, behavior modification is having its impact in clinical circles. Yet clinical psychologists' concerns extend beyond the scientific. They are interested in effectiveness of mental processes, and thus in praxiological matters.

Philosophical psychologists, at least in this country, would step forth with temerity. Yet their epistemological concern to

characterize adequate cognitive processes is essential to education. If a philosophical psychologist is within a unit designed 'Education', we usually use the name 'educational philosopher' rather than 'educational psychologist'. The later term is reserved for a scientific educational psychologist.

In all three branches of quantitative psychology, one can get in academia a response to 'psychologist'. In qualitative and performative psychology, the matter is different. This is to be expected, of course, since academicians have neglected qualitative and performative knowledge. The student who enrolls in a psychology course either to come to know the unique self or to come to know how to perform mentally is most often disappointed. The student is presented scientific knowledge. Literature courses and adjunct services might have fulfilled their objectives.

Where then are we to look for concern with qualitative and performative psychology? The search should be within the arts. Some novelists record qualitative psychological knowing. In the voluminous manuscript, Ulysses, that James Joyce brought to Paris in 1920, we find a description of Leopold Bloom's mental processes in all their uniqueness. Some practicing clinicians have recorded performative psychological knowledge. Self-psychoanalysis has resulted.

A similar narrative of response to the name 'sociologist' could be given. 'Sociologist' is taken to mean scientific sociologist.

In sociology, little attention is paid to praxiological and philosophical dimensions and hardly none at all to qualitative and performative ones. To increase the difficulty with respect to comprehension, not all social processes are taken as the domain of the sociologists. Economists and political scientists claim some social processes as their objects of study. Moreover, small group processes often are claimed by social psychologists.

Given the above short-sightedness, it is patent that educology is not being done comprehensively in psychology and sociology. Logically, of course, it should be compounded of the two fields. Each field should encompass the qualitative and performative as well as the quantitative, and within the quantitative the praxiological and philosophical as well as the scientific.

V

ON PRODUCING EDUCOLOGY

> The inquiry of truth, which is the love-making, or wooing of it, the knowledge of truth, which is the presence of it, and the belief of truth, which is the enjoying of it, is the sovereign food of human nature.
>
> Francis Bacon, Of Truth

There is no doubt that we have been mistaken both as what to woo and how to woo. The complete act of inquiry which is research demands we establish our domain through objectives, and our conceptual framework and so our research moves through models (11). Both our objectives and our models have been mistaken.

The objective of inquiry which is educational research is truth about education. We possess truth about education when we know about it. When we record this truth that we know, it becomes knowledge. It can be said, therefore, that the objective of educational research is to produce educology.

Because we were not clear about the sense of education, the kinds of knowledge of education, the nature of educology, and the relation of educology to other knowledge, we limited our wooing. We took knowledge of education to be only science of education and took psychologists and a few sociologists to be producing this. If we did educational research, our objective was to produce science of education. Our domain of inquiry was limited to the production of generalizations and observations of the teaching-studenting process.

Models for conceptual frameworks which I termed 'theory-models'(12)

may be classified as to whether they are mechanistic or organismic points of views. A mechanistic point of view is one that states of affairs are to be represented as a machine. A machine is an object that consists of parts that act in predetermined ways to bring about certain specific effects. Thus, in such an object the parts have natures which are non-alterable. These parts, consequently, have fixed actions. The actions which are specific to a certain kind of machine result from a combination of parts. The effects are linear and additive. Therefore, in a mechanistic state of affairs the emphasis is on its parts which are taken as non-modifiable and as the determining factors. The entire state of affairs or the whole is not taken as a determining factor.

The mechanistic point of view can be either non-statistical or statistical. The non-statistical mechanistic point of view works only to generate a representation of organized simplicity. It should be obvious why there is a limitation to systems of a few parts. To determine effects, an equation for each part in isolation, one for each combination of parts, and one for the context are required. So for a system of two parts only four equations are required, but for one of ten parts the number of equations increases to 1035. The growth in the number of equations arises from the possible combinations of parts. For n parts, there are 2^n combinations. Consider that for 20 parts, there are 2^{20} or over a million combinations.

A statistical mechanistic point of view generates a representation

of unorganized complexity. Rather than accounting for each combination or interaction of parts, one treats of average combinations or interactions. There is a shift from absolute values to probable ones. Of course, to secure accuracy the system must be large. The relative error of average values is of the order $1/\sqrt{n}$. Note that the system of 20 parts, mentioned as too large for non-statistical mechanistic treatment, is too small for the statistical approach. The error would be intolerable. An accuracy of approximately one in five will not suffice.

An organismic point of view is one that states of affairs are to be represented like an organism. An organism is a structured whole, i.e., one in which the content and form of its parts are determined by its function. Thus, in such an object the parts do not have non-alterable natures and so fixed actions. Rather parts act interdependently to maintain function, and thereby wholeness. The parts do not simply combine and then determine what the whole is to be. The content and form of the parts change relative to a whole. Therefore, in an organismic state of affairs the emphasis is on the whole or state of affairs taken as determining its parts. Representations of organized complexities are generated through organismic models.

We governed educational research by mechanistic educational theory models, and thereby badly wooed educational truth. The goal of educational research was interpreted as knowledge of the parts of

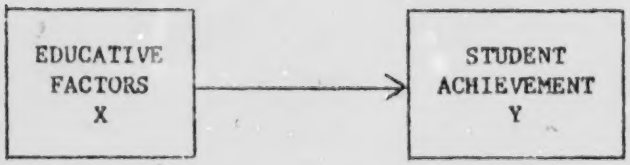
educative organizations, particularly of schools, as determinants of student achievement. Educational research was governed by an educative effects model. This model has been either statistical or non-statistical depending upon whether the standpoint has been psychological or sociological.

The psychologist takes an experimentalist's standpoint in which human systems are reduced to ones involving a small number of factors and the effects of these factors are taken as linear and additive. Schema 1 presents the psychological educative effects model. In this model all background factors, e.g., social status of the student, are controlled through manipulation of the educative process so that they are not permitted to have an effect on student achievement. Educative factors are investigated for their effects on student achievement.

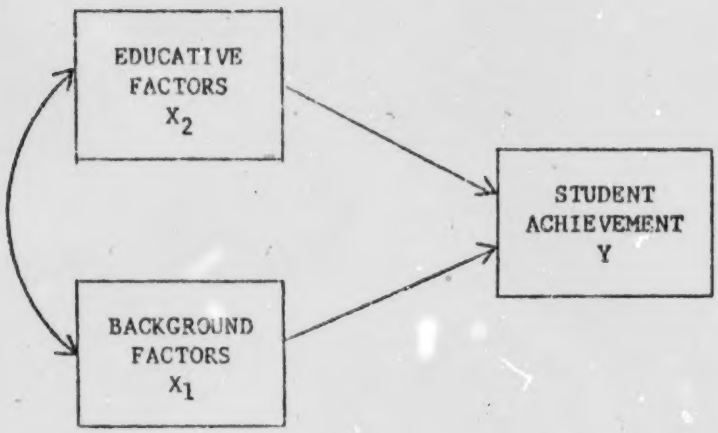
The sociologist takes a naturalistic standpoint in which factors are not ruled out through experimentation. Schema 2 presents the sociological educative effects model. This naturalistic approach is a statistical one. Regression analysis is common practice for sorting out factors and determining their significance. As seen in an equation such as

$$B_1X_1 + B_2X_2 = Y + e$$

where X_1, X_2, and Y are interpreted as in Schema 2, B is the number of units Y is expected to increase for an increase in one unit of X, and e is the error term, the model is still linear and additive.



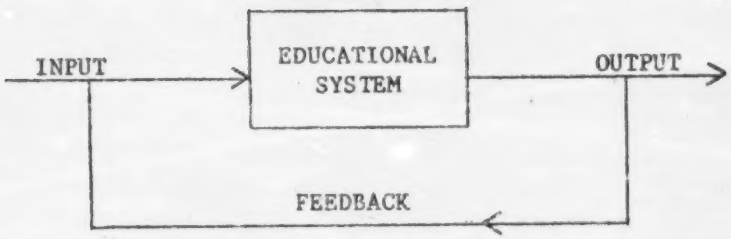
SCHEMA 1: PSYCHOLOGICAL EDUCATIVE EFFECTS MODEL



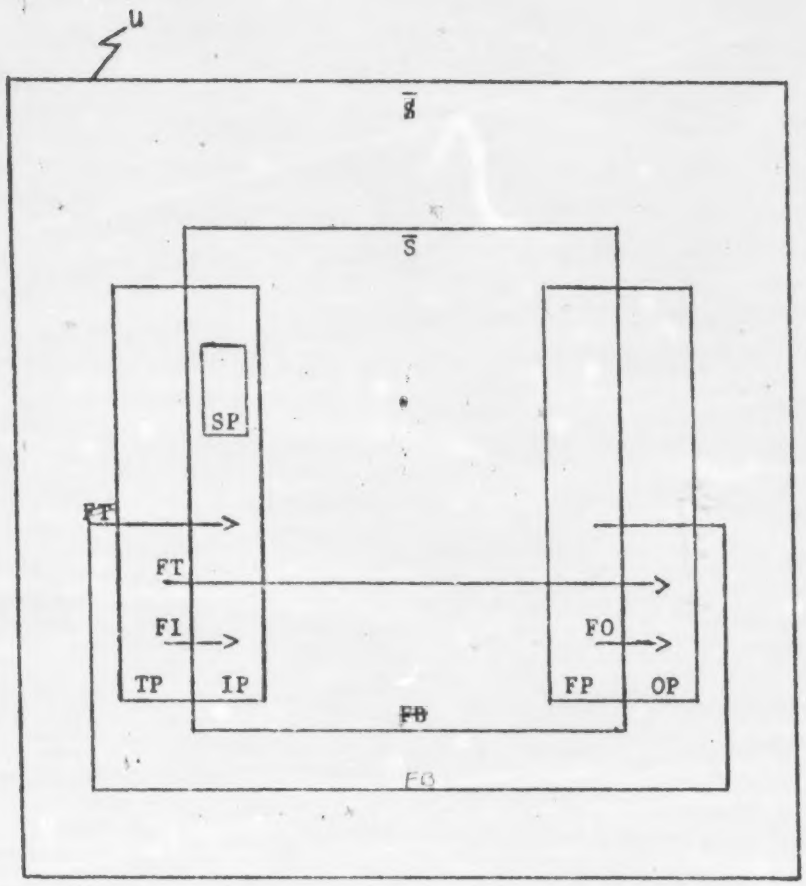
SCHEMA 2 : SOCIOLOGICAL EDUCATIVE EFFECTS MODEL

We need to do educational research through organismic theory models. Our goal must be knowledge of the dynamics of human cultivation configurations. These configurations would be represented as teaching-studenting systems, and hence as constituted by four sub-systems: teacher, student, curriculum, and setting. The curriculum is the selected culture for the student, and the setting, the context of attempting to bring and to come to cultivation. Also teaching-studenting systems may be characterized as either constructing, maintaining, or destructing. Learning takes place only in teaching-studenting systems which are constructing. Where there is learning, there is enhancement of the quality of life. Such enhancement is human cultivation. (13)

The SIGGS educational theory model (14) is an educative configuration model, i.e., it permits representation of organized complexity. Set theory enables quantification of a complex organization as a whole; graph theory of structure; and information theory, of action. Information theory extends the cybernetic educational theory model shown in Schema 3 so that education-surroundings interactions can be described. In SIGGS as presented in Schema 4, toput and a new sense of output are added to input and output which is now interpreted as fromput. Determination is now possible not only of what education takes in and what is available from it but also of what education's surroundings take in and what is available to them. Feedin, feed-through, and feedout are added to feedback which is now interpreted



SCHEMA 3 : CYBERNETIC EDUCATIONAL THEORY MODEL



'U' stands for universe of discourse
'S̄' stands for educational system
'S̄' stands for surroundings
'SP' stands for storeputness
'FT' stands for feedthroughness
'FI' stands for feedinness
'TP' stands for toputness
'IP' stands for inputness
'FO' stands for feedoutness
'FP' stands for fromputness
'OP' stands for outputness
'FB' stands for feedbackness

SCHEMA 4: SIGGS EDUCATIONAL THEORY MODEL

as flow from output to input. Transmission from and to both the system and its surroundings can be characterized.

To illustrate, the flow of culture from teacher to student can be represented through the concept of feedin, which is shared information. For this representation, culture must be interpreted as selective information, i.e., as probable occurrences in categories of societal expressions. Taking an H measure on the culture of the teacher that is available to the student (toput relative to the student subsystem) and H measure on the culture taken in by the student (input of the student subsystem) the T measure or commonality between toput and input can be obtained. Commonality indicates a flow in culture or decreased uncertainty which is what learning it.

VI

ON THE IMPORTANCE OF EDUCOLOGY

> Nam et ipsa scientia potestas est.
> Francis Bacon, Religious Meditations. Of Heresies

> Knowledge enormous makes a God of me.
> John Keats, Hyperion

At the very least educology allows us to sort out confusion in our language, and at the very most it gives us power over the teaching-studenting process.

'Education' is one of those terms that refers both to states of affairs and recorded descriptions about states of affairs. I have in mind terms like 'anatomy'. Human beings have anatomies, and when they are well researched the discipline of anatomy is furthered, knowledge about anatomy which is also called 'anatomy' results. Education too takes place, and when it is well researched the discipline of education is furthered, knowledge about education which is also called 'education' results. By using 'educology' for knowledge about education, the use of 'education' in these two senses can be eliminated; and thereby ambiguity reduced.

Numerous examples of ambiguity reduction through the use of 'educology' readily come to mind. Proponents of the educational efficacy of visual arts might welcome the reduction of the ambiguity centering about 'education' in

> the education of elementary teachers should include education as well as visual arts

by translating it as

The education of elementary teachers should include educology as well as visual arts.

Knowledge of education, no matter what it is called, gives power over the teaching-studenting process. That is to say, it permits one to treat education in a rational manner.

Science of education allows diagnosis and prognosis. Because one knows how instances are interrelated, one can perceive the course of education both past and to come. Never is the perceived future one of perfection. Thus, treatment is always required.

Philosophy of education and praxiology of education allow development of educational treatments or programs. Philosophy of education provides the valuable ends, and praxiology of education, the valuable means.

But educational programs must be actualized. They must be adjusted to the educational situations at hand, and they must be enacted. Consequently, yet other knowledge of education beyond the quantitative is of necessity. One must appreciate the present course of education that is to be treated so that the program can be adjusted. But this qualitative knowing is not enough. Performative knowing is wanted to add the final touch for the rendering of power over the teaching-studenting process.

VII
ON FURTHERING EDUCOLOGY

> Boswell: So, Sir, you laugh at schemes of political improvement?
> Johnson: Why, Sir, most schemes of political improvement are very laughable things.
> Boswell's Life, p. 102. 26 October 1769

Obviously, to further educology one should do it. To do it, of course, one must know how. Therefore, education in educational research methodology is a prerequisite. Yet it must be education in all of educational research methodology. Unfortunately, extant programs do not address themselves to qualitative or performative educational research. And very few address philosophical and praxiological educational research and the conceptual dimension of scientific educational research. Design and statistical methodology as it enters into the act of scientific educational research is primarily emphasized. Our attempt at Indiana University to overcome this dust bowl empiricism was reported at an earlier meeting of the American Educational Research Association (15). Subsequently, this attempt was not sustained politically at Indiana University.

Political sustenance is support through policies. Policies are constitutive rules for social organizations. Constitutive rules make social organizations what they are, because these rules prescribe their culture and structure.(16)

To further educology, units designated by the term 'Education' should set forth policies defining their units in terms of the

advancement of knowledge of education through its production and teaching. Moreover, these units should set forth policies structuring them to fulfill this mission.

Given no professional component beyond the education of scholars in educology, the only unit required is a general educology unit. No school of education would be required; educology could be a department in Arts and Sciences. The Ph.D. ('philosophy' in 'doctor of philosophy' is taken in a broad sense to mean any knowledge not just knowledge of valuable ends) could properly be the highest degree awarded by departments of educology. Furthermore, within these units students pursuing a general education or specializing in other disciplines could come to be taught about education. Perhaps general educology should be a course in the liberal education of a person.

Where there are programs for educating teachers or educational specialists, as administrators, counselors, etc., then policies should be instituted to structure the unit designated 'Education' to encompass these programs in the context of the mission to produce and teach knowledge of education. To do this general educology would have to be foundational to all the professional programs.

A teacher education program, for example, would be constituted of science of education, philosophy of education, praxiology of education, methods of qualitative knowing, and performative knowledge. Science, philosophy and praxiology of education would prepare the

teacher to develop an intervention, and thus make the teacher theoretically adequate. Methods of qualitative knowing would prepare the teacher to take a situational standpoint, and thus make the teacher sensitive. Performative knowledge would prepare the teacher to intervene, and thus make the teacher procedurally sound. It should be obvious that educology could not be taught without field-related activities. For instance, situational standpoints require situations in which to take them. To summarize, a teacher education program would have as its goal rational teacher action. Since

teacher action is rational
iff
1. theoretical adequate
2. sensitive and
3. procedurally sound,

educology is foundational to the education of teachers. Educology makes teachers professionals.

As an illustration of a restructuring entailed by what has been said above, the following units are proposed for the School of Education of Indiana University: General Educology, Teacher Education, Curriculum Specialist Education, Educational Administrator Education, Educational Counselor Education, Educational Psychologist Education, Educational Program Developer Education, and Educational Technologist Education. The Ed.D. should be conferred for advanced professional programs. General Educology would be foundational to the professional programs, but would have a program in its own right. The Ph.D would be its advanced degree.

It is important to stress that educology must have its own program. Unless educology is nutured, the professional foundation of education will crumble. Knowledge of education must advance, if education is to advance. Only persons knowledgeable about education--professionals--can treat educational maladies.

Still what hope is there for furthering educology? David Clark has diagnosed a recession for units designated by 'Education'. He tells us thrt enrollments and resources relative to research and teaching will decline. Also he tells us that there will be federal monies going to local and state agencies for utilization of educology and that we can probably get in on them. (17)

But to share in the monies is to turn our energy from the production of educology to its utilization. Who then will advance educology? What will happen to the mind of professionalism? Without educology, there will be no knowledge to teach educational professionals. We should leave educology utilization to the educational professionals whom we teach the educology that we produce. We should not be bought.

NOTES

1. I have discussed the sense of education elsewhere (e.g. "The Non-identity of Philosophy and Theory of Education," in Readings in Philosophy of Education, edited by John Rich, Belmont, California: Wadsworth Publishing Company, Inc., second edition, 1972). Hopefully, this is an advance over those discussions.

2. Along with George S. Maccia I have been constructing educational theory within the conceptual framework of SIGGS.

3. "On the Structure of Knowledge of Education," in Volume 6 of Proceedings of the XVth World Congress of Philosophy, Varna, Bulgaria, 1973. In this paper, I indicated that George S. Maccia's work in pedagogical epistemology led me to extend educology to include qualitative and performative knowledge.

4. "Logic of Education and of Educatology: Dimensions of Philosophy of Education," Proceedings of the Twentieth Annual Philosophy of Education Society, 1964.

5. "Toward Educational Theorizing without Mistake," Studies in Philosophy and Education, Volume VII, Number 2, 1970.

6. The four collections by Lowry W. Harding are (1) Anthology in Educology, Dubuque, Iowa: W. C. Brown Co., 1951, (2) Essays in Educology, Dubuque, Iowa: W. C. Brown Co., 1956, (3) More Essays in Educology, Columbus, Ohio: Association for the Study of Educology, 1964, and (4) Educology: The Fourth Collection, Columbus, Ohio: The Association for the Study of Educology, 1975.

7. "Educology: The Theory of Educational Practice," Contemporary Educational Psychology, I, 274-284, 1976.

8. Harding, 2, p.x.

9. Ibid., p.xi.

10. Harding, 1, p. 23.

11. The complete act of inquiry is set forth in Logical and Conceptual Analytic Techniques for Educational Researchers, a mini-book for a mini-course given at the American Educational Research Association, San Francisco, 1976.

12. "The Model in Theorizing and Research," Institute V Use of Theoretical Models in Research, International Reading Association, Newark, Delaware, 1966.

13. "SIGGS Theory as a Systems Theory for Education Which Enhances the Quality of Life," Systems Thinking and the Quality of Life, Proceedings of the Society for General Systems Research, 1975.

14. Development of Educational Theory Derived from Three Theory Models, with George S. Maccia, Cooperative Research Project No. E-022, U. S. Office of Education, 1966.

15. "Philosophical Dimensions of Educational Research Training Programs: The Indiana University Program," Washington, D.C.,1975.

Affirmative Action Plans: A Policy Analysis

16. "~~Educational Policy: Design, Analysis, Interfaces~~," Viewpoints, Indiana University, 1975.

17. "The Real World of the Teacher Education: A Look to the Near Future," American Association of Colleges for Teacher Education, 1977.